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FFI/PTS Investigation confirms: Folding Cartons recyclable in the waste paper stream

Frankfurt am Main, 15 December 2020

FIBRE CAN BE COMPLETELY RECYCLED

Folding cartons are recyclable as part of the paper stream collected from private households. This is confirmed by a recent, wide-ranging study commissioned by the Fachverband Faltschachtel-Industrie (German Folding Carton Association, FFI) from the Papiertechnische Stiftung (PTS). All the analyzed folding carton types revealed that the fibre component of the various folding carton packaging can be fully recycled. As expected, the pulp yield was reduced only by the proportion of non-paper product components, e.g. plastics from barrier coatings or window materials. Even a disintegration time reduced to ten minutes – compared to 20 minutes according to the test standard – has no influence on the fibre yield, since with few exceptions the maximum fibre content was already disintegrated within the shorter interval.

NO RESTRICTIONS ON THE QUALITY OF THE FIBRES

In addition, the quality of the pulp (recyclate) obtained in terms of stickiness or optical inhomogeneities showed no restriction with regard to mechanical recycling via the paper stream collected from private households.

Although visually disturbing inhomogeneities or increased stickiness did occur in individual samples of the categories print/coating and adhesive applications, these

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can either be separated or are to be classified as non-critical in the waste paper household collection.

The same applies to metallisation, which in the samples examined was applied to the folding cartons via PET lamination or cold foil transfer. It is true that in these applications the metallisation leads to poorer separability of these particles in sorting, which caused visually disturbing impurities. However, these are recyclable in a mixture like paper household waste.

EVEN COATED FOLDING CARTONS CAN BE RECYCLED IN WASTE PAPER STREAM

Plastic components from inner coatings and outer coating laminations fragment, i.e. they decompose slightly, but were easily separable during sorting. This proves in particular that folding cartons coated on one side are recyclable in the waste paper household collection. The same was confirmed for cup materials, four samples of which were also analyzed in the investigation. If such cup materials do not have a wet strength treatment, they would also be recyclable in the mixed paper stream collected from households.

CLOSED-LOOP RECYCLING OF FOLDING CARTONS IS SUSTAINABILITY IN ACTION

"The study confirms the practice that has been followed for decades, according to which consumers do everything right when they put folding cartons into recovered paper for recycling after product removal," says Andreas Helbig, FFI Board Spokesman.

The recycling of folding cartons as a sub-fraction of paper, carton and cardboard has been established for decades through collection, sorting and material recovery in the waste paper stream. Waste paper has a market value as a raw material, and the recycling rates reflect this success. "The closed-loop recycling of the recycle

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'waste paper fibre' - also from folding cartons - is sustainability in practice," Helbig continues.

STAKEHOLDERS DEMAND EVIDENCE OF RECYCLABILITY

The FFI considers its current study to be an important contribution by the folding carton industry to the current social and environmental policy debate on the closed-loop recycling and recyclability of used packaging. On the one hand, the brand owners and retailers are increasingly formulating principles and standards for packaging according to which it should be recyclable or have certain recycled content. On the other hand, the disposal companies (Dual Systems in Germany) have the legal mandate to inform consumers about the correct separation of used packaging waste. For this purpose, they need recommendations and evidence for defined criteria regarding the allocation of packaging to the different collection systems (paper, comingled, glass, residual waste, etc.). And finally, it is the policy maker who specifies the product responsibility for placing packaging on the market and requirements for the recyclability of packaging (Packaging Act in Germany). This is the basis for the "Minimum standard for the assessment of the recyclability of packaging subject to system participation" of the Central Agency Packaging Register (ZSVR), which specifies the minimum criteria for determining the recyclability of packaging.

With this broad-based study, the FFI wants to provide answers to the questions of whether and how the different material combinations and finishing processes used in folding carton production influence the individual recyclability of folding cartons. "Together with PTS, we as FFI are thus for the first time generating general and concrete scientific and technically reliable findings on the recyclability of folding cartons and their material combinations," explains Helbig. "In addition, we as an association are thus supporting our member companies in answering their customers' enquiries about the recyclability of specific packaging," Helbig continues.

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The study is designed as a "type test" in order to enable FFI members to derive from a type-similar type of the study to a concrete folding carton packaging produced or to be produced on behalf of a customer. With reference to the FFI type examination, this may make it unnecessary for member companies to conduct their own examinations in cases where the technical specifications of the customer's packaging match those of a sample from the FFI examination.

EXAMINATION FOR FOLDING CARTONS REPRESENTATIVE

Both for the basic proof that folding cartons can be recycled in waste paper and for the use as a type test in individual cases, the sample selection of the folding carton variants had to be representative. To ensure this, typical folding cartons from food segments (dry food, frozen food, confectionery, tea/coffee, cereals) and non-food segments (cosmetics, pharmaceuticals) were selected according to market relevance. From these segments, various feature groups representing the common spectrum of material combinations, such as printing and varnish, outer and inner coating, adhesive applications and windows, were identified and investigated as parameters influencing recycling. In addition, typical material types (conventional or low-migration offset printing inks and dispersion varnishes, dispersion adhesives, PE extrusion, PET lamination, etc.) and average application quantities, layer thicknesses or surface coverings were selected in each feature group. In this respect, the statements on the recyclability of folding cartons in the waste paper stream apply to the selected study samples and their technical specifications, but do not apply to combinations of other materials that were outside the study design, such as flexo, gravure or digital printing inks, screen printing varnishes, sealing varnishes, hotmelt adhesives, et cetera. Such material combinations may be part of further association examinations.

The tests were carried out according to the method PTS-RH 021/97 (version 2012) for the collection route of paper stream collected from private households, which is

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also referenced in the minimum standard of the ZSVR for the assessment of the recyclability of packaging made of paper and cardboard. This method is used to assess the essential aspects of recyclability: the defiberability of the packaging material and the potential for interfering substances to enter.

FURTHER NEED FOR INVESTIGATION IDENTIFIED

The study also shows a need for further investigation. On the one hand, this exists in the area of the interaction between dispersion varnish and printing inks with regard to the formation of visually disturbing particles and the deinkability of printing inks in combination with dispersion varnish. There is still little knowledge about this interaction between printing inks and dispersion varnish. In addition, printing inks for folding carton printing have not yet been specified as deinkable in procurement. On the other hand, the FFI will analyse the fragmentation and separation behaviour of metallic pigments and their various transfer processes with further studies and the support of the relevant suppliers. Increased attention will also be paid to the sorting behaviour of outer or inner functional coatings with regard to film thickness and strength. From time to time, rumours emerge among experts that carton packaging coated with plastic is not recyclable or only recyclable to a limited extent. "The opposite is the case," as Andreas Helbig states with reference to the corresponding samples in the current study. "All selected coating samples are recyclable in waste paper," Helbig continues. "We will vary the specifications of the coatings in additional investigations to further substantiate the finding that coated folding cartons also belong into recovered paper - where, incidentally, consumers have been disposing them with a clear conscience for decades."

In addition, other application processes and material combinations that have not or only partially been the subject of this study are also of interest. These include, for

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example, flexographic, gravure or digital printing inks, screen printing varnishes, sealing varnishes, hot embossing, hotmelt adhesives, etc.

About FFI Fachverband Faltschachtel-Industrie (German Folding Carton Association)

Since 1948, German Folding Carton Association FFI has been representing the interests of more than 60 companies with over 80 production locations that manufacture approximately 9,500,000 tonnes of folding cartons per year, amounting to a production value of approximately EUR 1.94 billion. The members of the FFI account for roughly two thirds of the industry's sales. The folding carton industry has some 9,500 employees from numerous professions, including industry-specific ones such as packaging engineers, printers, packaging technicians, packaging developers or media designers as well as commercial, technical and logistic professions. The industry is currently training almost 700 apprentices and has a long tradition of being a future-oriented and responsible employer. FFI supports its members by providing them with a wide range of products and services; in doing so, it helps them to make sustained improvements in their competitive position. The range of committees and information provided by FFI is unique anywhere in Europe. FFI works systematically on transferring know-how and increasing skill levels via information events and training seminars as well as via manuals, guidelines, samples and checklists.

Appendix

Short Report FFI/PTS-Projekt „Recyclability of Folding Cartons and Material Combinations“ (2020)

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